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Boards of Appeal

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Case Number : T 32/83

DECISION

of the Technical Board of Appeal 3.3.1

of 30 August 1983

Appellant: UNILEVER PLC, London EC4, England and
UNILEVER NV, Rotterdam, Netherlands

Representative: Fransella, Mary Evelyn,
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Decision under appeal: Decision of the Examining Division 023 of 4 October 1982 to reject European Patent Application No. 80 303 776.1 in accordance with Article 97(1) EPC.

Composition of the Board:

Chairman: D. Cadman
Member: K. Jahn
Member: L. Gotti Porcinari

SUMMARY OF FACTS AND SUBMISSIONS

I European Patent Application No. 80 303 776.1 filed on 24 October 1980 and published on 13 May 1981 under publication No. 0 028 488, claiming the priority of the British prior application of 25 October 1979, was refused by decision of the European Patent Office dated 4 October 1982 on the basis of 11 claims of which claim 1 had the following wording:

"A process for bleaching a naturally occurring oil or fat with an aqueous polar bleaching agent, characterised in that the process is carried out in the presence of a phase transfer catalyst."

II The stated ground for the refusal was that the subject-matter of that claim did not involve an inventive step having regard to the prior art disclosed in the following documents:

(1) US-A-2 369 757
(2) US-A-2 022 738
(3) US-A-3 996 259

It is known from (1) (claim 7) to use a hydrogen peroxide bleaching agent to bleach oils, and it is known from (2) (claim 1) to bleach fats or oils using a hypochlorite bleaching agent. Both hypochlorites and peroxides are mentioned in claim 4 of the present application as preferred polar bleaching agents.

The process as claimed in claim 1 differs from those disclosed in (1) and (2) in that it is carried out in the presence of a phase transfer catalyst.

.../...

It is known, however, from (3) that an organic compound oxidisable by aqueous hypohalite ions may be oxidised in a water-immiscible liquid organic phase in the presence of a catalytic amount of a quaternary ammonium salt and/or a quaternary phosphonium salt, in addition to an aqueous phase containing hypohalite ions. These quaternary salts are stated to be preferred catalysts for use in the present application (page 4, lines 25 to 31). It is therefore considered that a person skilled in the art would find it obvious to use a phase transfer catalyst in the oxidative bleaching of the coloured substances present in fats or oils by means of a polar bleaching agent, since it is already known from (1) and (2) that such coloured substances are oxidisable by polar bleaching agents.

III On 20 November 1982 the appellant lodged an appeal against the decision dated 4 October 1982 and on 26 January 1983 submitted a Statement of Grounds, offering a new set of 8 claims (received on 15 July 1983) of which claim 1 has the following wording:

"A process for bleaching a vegetable or animal oil or fat with an oxidative bleaching agent, characterised in that the oil or fat is treated with from 0.5 to 10% by weight of an oxidative bleaching agent selected from hypochlorites, peroxoacids, hydrogen peroxides and mixtures thereof, the oxidative bleaching agent being in aqueous solution and the reaction being carried out in the presence of from 0.2 to 10 mole %, based on the bleaching agent, of a phase transfer catalyst". The grounds of appeal are essentially as follows:

In the state of the art, as represented by actual practice in the soapmaking industry, palm oil is bleached using sulphuric acid-activated Fuller's earth, sal and rice bran oil with chlorine dioxide, and neem oil with sodium chlorite and mild acid. These bleaching methods have considerable disadvantages; nevertheless, their use has persisted despite the publication, in 1935 and 1945 respectively, of citations (2) and (1) suggesting the use of the apparently more tractable materials, hydrogen peroxide and sodium hypochlorite. Evidently the processes described in those specifications are simply not feasible and practicable when applied to the naturally-occurring oils used in soapmaking.

Although document (1) describes the use of hydrogen peroxide for bleaching oils, the skilled man is likely to infer from it that this bleaching agent can be used only in the vapour phase and only using the elaborate apparatus and process control steps described.

The skilled man reading document (2), which discloses the bleaching of animal and vegetable oils by means of hypochlorites, would infer that hypochlorite can be used to bleach oils only if an elaborate procedure is followed. Documents (1) and (2) were published in 1945 and 1935 respectively. Thus it is true to say that it has long been known, as a paper proposition, that oils might be bleached using hypochlorite or hydrogen peroxide. The very fact that to this day these materials are not in commercial use for this purpose indicates that there must be good reason for not using them, when the materials in actual use in the art are more inconvenient, expensive or hazardous.

Kirk-Othmer's Encyclopaedia of Chemical Technology, Third Edition, Wiley-Interscience, pages 812-813, confirms that oxidative bleaching is conventionally regarded in the art as too disadvantageous to use, despite the problems associated with adsorptive bleaching as described at page 812 line 38, page 38 line 9.

In J. Am. Oil Chemists Soc. 53 (1976), pages 342-343, which refers specifically to the methods commonly in use for decolorising palm oil it is stated that almost all vegetable oils are earth bleached, with different grades of activation of the bleaching clay used.

Document (3) relates to the oxidation of certain organic compounds selected from the group consisting of amines, amides, alkanols, primary and secondary alkanols, and organic compounds containing an activated double bond, with aqueous hypohalite ion in the presence of a phase transfer catalyst. No particular commercial field of use is suggested, and there is no general teaching relating to oxidative bleaching, i.e. the special case of oxidation in which the starting material is coloured and the product colourless; and furthermore there is no specific teaching relating to the oxidation of natural pigments such as beta-carotene and chlorophyll, which are complex molecules that cannot readily be fitted into the classes of oxidisable compounds taught, as may be seen from the extracts from "Dictionary of Organic Compounds", e.d. I.M. Heilbron, London 1934.

The present invention is, however, much more than the realisation that these pigments can be oxidatively bleached by hypochlorite in the presence of a phase transfer catalyst. It also involves the discovery that

such oxidative bleaching can be applied successfully to the commercially highly important process of decolourising natural oils for soapmaking. This is a very different matter from the somewhat academic disclosure of document (3).

Accordingly, the applicants request a reversal of the decision of the Examining Division and the grant of a European patent.

REASONS FOR THE DECISION

1. The appeal is in accordance with Articles 106-108 and Rule 64 EPC; it is therefore admissible.

2. There can be no formal objection to the current version of the claims, since it is adequately supported by the original documents.

3. As indicated in the preamble of the present application, the applicant starts from the state of the art, as presented by actual practice. According to the applicant the particularly highly-coloured palm oil is decolourised by acid-activated Fuller's earth. This process is expensive and the disposal of the spent earth presents a problem. Sal and rice bran oils are currently bleached with chlorine dioxide which is a hazardous reagent. Neem oil is bleached using sodium chlorite and mild acid.

   Furthermore, document (2) discloses the bleaching of naturally occurring oils and fats, such as animal or vegetable fats and oils, by means of hypochlorites (cf. page 1, left column, paragraph 1 in combination with

page 3, left column, lines 21 to 23). Thereby the bleaching agent is preferably used in aqueous solution (cf. page 1, left column, lines 44 to 48 and right column, lines 7 to 11). Although it is stated in this document that the process can be carried out on a commercial scale (cf. page 1, left column, lines 21 to 26), the appellant has argued to the Board's satisfaction that it was not introduced into industrial practice since the action of polar bleaching agents, such as hypochlorite, on these oils and fats is slow and incomplete because of the hydrophobic nature of the oils and fats (cf. page 2, lines 14 to 17 of the present application).

4. From an objective view, the problem underlying the present application vis-à-vis this closest prior art can be seen as avoiding the disadvantages associated with the known process of bleaching a vegetable or animal oil or fat by means of oxidative bleaching agents such as hypochlorites in aqueous solution. In order to solve this problem the applicant proposes essentially to carry out the bleaching in the presence of a phase transfer catalyst.

5. According to the finding of the Examining Division, which is not disputed, such a technical teaching is novel. It is therefore to be examined whether the subject-matter of claim 1 is obvious in relation to the prior art. To that end, besides document (2), particularly document (3) has to be taken into consideration where the oxidation of organic compounds oxidisable by aqueous hypohalites, especially the hypochlorite ion, in a two-phase system using a phase transfer catalyst is described (cf. column 1, paragraph 1 in combination with

claims 1 and 2). As specified in this document, such a process proceeds under mild conditions to high yields and in a reduced reaction time, and is in every case more efficient than the non-catalysed hypohalite oxidation (cf. column 1, lines 42 to 46).

An expert who felt the bleaching of naturally occurring oil and fats in the absence of a catalyst disadvantageous in view of the too slow and incomplete reaction and addressed himself to the problem of overcoming these drawbacks of the old process, could expect that this problem would be solved by means of a phase transfer catalyst as described in document (3), since he could expect that by means of that catalyst the bleaching of oils and fats by aqueous hypochlorite would proceed to high yields and in reduced time and could be performed, in every case, more efficiently.

6. The appellant attempts to reduce the significance of these citations by saying that document (2) is merely a paper proposal and document (3) is a publication of academic significance which both failed to induce the skilled person to develop the appellant's commercially highly important process. The Board feels bound to say that, when assessing inventive step, a pure scientific publication must not necessarily be given less weight than a publication which discloses industrially and commercially used subject-matter.

It is true that the process according to document (2) requires a certain temperature control and alternate periods of agitation and settling (cf. claim 1); it is also true that the preferred standard bleaching liquor, the use of which is not excluded in the appellant's process, is prepared in a relatively complicated fashion

(cf. page 1, right hand column, lines 7 to 29), although sodium hypochlorite may be used as well (cf. page 1, left hand column, line 43). However, these facts would not lead the expert to the conclusion to label the process according to document (2) published as early as 1935 as "unable to be improved for practical purposes". For that, the inexpensive and convenient bleaching agent hypochlorite is economically much too interesting, as apparently admitted by the appellant (cf. Statement of Grounds of Appeal, paragraph 5, sentence 4). Consequently, the expert may be presumed to have persistently kept in mind the bleaching of oils and fats by hypochlorites and watched for publications which, such as document (3), offered the prospect of eliminating the drawbacks of the old bleaching process using hypochlorite.

7. Although no particular commercial field of use is suggested in document (3) and there is no hint in this document to bleaching and to oils and fats, nevertheless the person skilled in these fields would have directed his attention to any kind of oxidation processes which take advantage of the economically interesting oxidation agent hypochlorite. In doing so he would have stumbled on document (3) without fail, offering the prospect of a substantial improvement of oxidation by hypochlorite in a two-phase aqueous-organic system. The fact that in this document only simple organic compounds are particularly named as starting materials does not tell against a broad interpretation of the scope of the process. At any rate, the information on oxidation of organic compounds oxidisable by aqueous hypohalites would have taught the expert that the compounds responsible for the colour of naturally occurring oils and fats could be bleached with success in this way, since these colouring

impurities fall within the terms of such organic compounds (cf. document (2)). It is, therefore, of no importance that the natural pigments beta-carotene and chlorophyll which both are the essential colouring impurities of oils and fats (cf. present application page 1, paragraph 2 in combination with text-book knowledge in Houben-Weyl, Methoden der Organischen Chemie 4. Aufl. Vol. 11 (1976) page 483, left column below) are not labelled as oxidisable compounds in the Dictionary of Organic Compounds, e.d. I.M. Heilbron, London 1934, pages 242 and 320, cited by the appellant.

8. Apparently, the appellant considers the fact that industrial bleaching of oils and fats has consistently been carried out by absorption of the impurities on earth and that the Examining Division was unable to cite documents in which the idea of phase transfer catalysis had been widely taken up in industrial and commercial contexts as an indication for non-obviousness of the present application. In this connection the appellant submits two literature references, i.e. Kirk-Othmer's Encyclopaedia of Chemical Technology, Third edition, Wiley-Interscience, pages 812-813, and J. Am. Oil Chemists Soc. 53 (1976), pages 342-343. According to these documents bleaching can be achieved oxidatively or thermally but these methods have disadvantages. Thus, adsorptive bleaching is widely used despite the problems associated with that method.

However, it is the Board's view that nothing could be derived from this in favour of the appellant's arguments. Industrial processes which are actually carried out on a large scale cannot normally be simply abandoned and the expensive and durable equipment be scrapped with

substantial loss of investment, even if a promising alternative technique is published in the literature. The industrial development of a new process proceeds through various stages and is relatively slow. The time required for turning a scentific promise into a commercially operative technology is considerable and cannot be an argument in favour of non-obviousness of the former. In this context the Board has already taken into consideration in favour of the appellant that the idea of phase transfer catalysis in a two-phase aqueous-organic system first captured the attention of organic chemists as early as in the late 1960s rather than in 1976, the date of publication of document (3).

9. Besides the oxidative bleaching of a vegetable and animal oil and fat by means of an aqueous hypochlorite in the presence of a phase transfer catalyst, which is to be judged obvious, claim 1 contains as further features the amount of the bleaching agent (0.5 to 10% by weight) and the amount of phase transfer catalyst, based on the bleaching agent (0.2 to 10 mol %). These features, however, are a matter of routine for a skilled person (cf. document (3) column 2 line 58 to column 3 line 8).

10. The process outlined in claim 1 thus does not involve an inventive step. Claim 1 therefore cannot be allowed under Article 52(1) EPC.

Claims 2-8 are dependent on claim 1 and fall with the latter in the absence of any auxiliary request from the appellant concerning them. Neither are there any additional features in these claims which would appear to introduce patentability, nor have any of them been argued by the appellant to have such consequences.

ORDER

It is decided that:

The appeal against the decision of the Examining Division of the European Patent Office dated 4 October 1982 is dismissed.

The Registrar: The Chairman:

signed: J. Rückerl signed: D. Cadman